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10/652,326	08/29/2003	Anand A. Kekre	VRT0098US	1638
50429 7590 12/15/2009 CAMPBELL STEPHENSON LLP 11401 CENTURY OAKS TERRACE BLDG. H, SUITE 250 AUSTIN, TX 78758				
EXAMINER				
PHAM, KHANH B				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

Application No.	Applicant(s)	
10/652,326	KEKRE, ANAND A.	
Examiner	Art Unit	
Khanh B. Pham	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-8,10,12-15,17,19-21,27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-8,10,12-15,17,19-21,27 and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/17/2009 has been entered.

### ***Claim Rejections - Applicant Admitted Prior Art***

2. **Claims 1, 3, 5-8, 10, 12-15, 17, 19-21, 27-28** are rejected as being anticipated by Applicant Admitted Prior Art, Specification page 2-5 and Figs. 1-2, hereinafter "AAPA".

**As per claims 1, 8, 15**, AAPA teaches an apparatus, and machine readable medium for performing a method comprising:

- "synchronizing a data volume of a first node, a data volume of a second node, a data volume of a third node, and a data volume of a fourth node" at [0006], [0008],  
(“ data volumes of primary node 100, intermediary node 102, and secondary node

104 are initially synchronized" , and " additional intermediary nodes may be provided")

- "replicating data to be written to said data volume of said first node to said data volume of said second node from said first node" at [0009] ("Replication facility 110 then replicates the data to be written to data volume 116 within intermediary node 102" )
- "writing said data to said data volume of said first node, wherein said writing is performed after or in parallel with said replicating said data to said data volume of said second node" at [0009] (" writing data to local data volume 108 and transferring a copy of the data to be written to intermediary node may start and/or complete in any order or may be performed in parallel" )
- "replicating said data to said data volume of said third node, wherein said replicating said data to said data volume of said third node is performed using periodic replication at a first frequency from said second node to said data volume of said third node" at [0012] and Fig. 1(" data volume 124 within secondary node 104 is periodically updated with changes resulting from write operations on data volume 116 over a period of time")

- “replicating said data to said data volume of said fourth node, wherein said replicating data to said data volume of said fourth node is performed using periodic replication at a second frequency from said second node to said data volume of said fourth node, wherein said first frequency is different than said second frequency” at [0005], [0012]-[0013] and Fig. 2. (“ high-frequency data replication is performed over short, high-speed links” “ is coupled (e.g., cascaded) with” “ low-frequency data replication is performed over longer, low-speed links” ).

**As per claims 3, 10, 17**, AAPA teaches an apparatus, machine readable mediums for performing a method comprising:

- “synchronizing a data volume of a first node, a data volume of a second node, a data volume of a third node, a data volume of a fourth node, and a data volume of a fifth node” at [0006], [0008], (“ data volumes of primary node 100, intermediary node 102, and secondary node 104 are initially synchronized” , and “ additional intermediary nodes may be provided” );
- “replicating data to be written to said data volume of said first node to said data volume of said second node from said first node” at [0009] (“Replication facility 110

then replicates the data to be written to data volume 116 within intermediary node

102" )

- "writing said data to said data volume of said first node, wherein said writing is performed after or in parallel with said replicating said data to said data volume of said second node" at [0009] (" writing data to local data volume 108 and transferring a copy of the data to be written to intermediary node may start and/or complete in any order or may be performed in parallel" )
- "replicating said data to said data volume of said third node, wherein said replicating said data to said data volume of said third node is performed using asynchronous replication from said second node to said data volume of said third node" at [0012] and Fig. 1(" data volume 124 within secondary node 104 is periodically updated with changes resulting from write operations on data volume 116 over a period of time")
- "replicating said data to said data volume of said fourth node, wherein said replicating said data to said data volume of said fourth node is performed using periodic replication at a first frequency from said third node to said data volume of said fourth node" at [0012] and Fig. 1(" data volume 124 within secondary node

104 is periodically updated with changes resulting from write operations on data volume 116 over a period of time")

- "replicating said data to said data volume of said fifth node, wherein said replicating said data to said data volume of said fifth node is performed using periodic replication at a second frequency, from said fourth node to said data volume of said fifth node, wherein said first frequency is different than said second frequency" at [0005], [0012]-[0013] and Fig. 2. (" high-frequency data replication is performed over short, high-speed links" " is coupled (e.g., cascaded) with" " low-frequency data replication is performed over longer, low-speed links" ).

**As per claims 5, 12, 19**, AAPA teaches the method of claim 3, wherein "said first node is a primary node, said second node is an intermediate node, and said third node is a secondary node" at Fig. 1.

**As per claims 6, 13, 20**, AAPA teaches the method of claim 5, further comprising: "replicating said data to a plurality of secondary nodes from said intermediate node" at [0013] and Fig. 2.

**As per claims 7, 14, 21**, AAPA teaches the method of claim 3, wherein :

- "said replicating said data to said data volume of said second node comprises replicating said data to said data volume of said second node using a first data link coupled between said first node and said second node" at [0005] and Fig. 1;
- "said replicating said data to said data volume of said third node comprises replicating said data to said data volume of said third node using a second data link coupled between said second node and said third node" at [0005] and Fig. 1;
- "said first data link has a different bandwidth than said second data link" at [0005].

**As per claim 27**, AAPA teaches the method of claim 1, further comprising:

- "intercepting a request to write said data, wherein said intercepting is performed after said synchronizing, and said request was sent by an application" at [0008] (" when application 106 requests that a write operation be performed on its behalf to data volume 108, replication facility 110 intercepts the write" )
- "storing said data within a log of said first node, wherein said storing is performed after or parallel with said intercepting" at [0008] (" Replication facility 110 then writes the data to be written by the requested write operation to storage replicator log 112" )
- "notifying said application that said request has been completed, wherein said notifying is performed after or in parallel with said storing" at [0010] (" replication



facility 110 waits until an acknowledgement is received from replication facility 114 before notifying application 106 that the write operation is complete")

- "said replicating said data to said data volume of said second node is performed after or parallel with said notifying" at [0009] ("... may start and/or complete in any order or may be performed in parallel").

**As per claim 28**, AAPA teaches a method comprising:

- "synchronizing a data volume of a first node, a data volume of a second node, and a data volume of a third node" at [0006], [0008], (" data volumes of primary node 100, intermediary node 102, and secondary node 104 are initially synchronized" );
- "intercepting a request to write data to said data volume of said first node, wherein said intercepting is performed after said synchronizing, and said request was sent by an application" at [0008] (" when application 106 requests that a write operation be performed on its behalf to data volume 108, replication facility 110 intercepts the write" );

- "storing said data within a log of said first node" at [0008] (" Replication facility 110 then writes the data to be written by the requested write operation to storage replicator log 112" );
- "notifying said application that said request has been completed, wherein said notifying is performed after or in parallel with said storing" at [0010] (" replication facility 110 waits until an acknowledgement is received from replication facility 114 before notifying application 106 that the write operation is complete")
- "replicating said data to said data volume of said second node from said first node, wherein said replicating is performed alter or in parallel with said notifying" at [0009] (" Replication facility 110 then replicates the data to be written to data volume 116 within intermediary node 102", "transferring a copy of the data to be written to intermediary node may start and/or complete in any order or may be performed in parallel").
- "writing said data to said data volume of said first node" at [0010] ("The data is then written to data volume 108");

- “replicating said data to said data volume of said third node from said second node, wherein said replicating said data to said data volume of said third is performed using periodic replication at a first frequency from said second node to said data volume of said third node” at [0012] and Fig. 1 (“ data volume 124 within secondary node 104 is periodically updated with changes resulting from write operations on data volume 116 over a period of time”).

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 5-8, 10, 12-15, 17, 19-21, 27-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Cochran et al. (US 2004/0230859 A1), hereinafter “Cochran”.

As per claims 1, 8, 15, Cochran teaches an apparatus, and machine readable medium for performing a method comprising:

- "synchronizing a data volume of a first node, a data volume of a second node, a data volume of a third node, and a data volume of a fourth node" at Figs. 1, 6;
- "replicating data to be written to said data volume of said first node to said data volume of said second node from said first node" at [0050] and Figs. 9-11;
- "writing said data to said data volume of said first node, wherein said writing is performed after or in parallel with said replicating said data to said data volume of said second node" at [0050] and Figs. 9-11;
- "replicating said data to said data volume of said third node, wherein said replicating said data to said data volume of said third node is performed using periodic replication at a first frequency from said second node to said data volume of said third node" at [0020]-[0026], and Figs. 1, 6
- "replicating said data to said data volume of said fourth node, wherein said replicating data to said data volume of said fourth node is performed using periodic replication at a second frequency from said second node to said data volume of said fourth node, wherein said first frequency is different than said second frequency" at [0020]-[0026] and Figs. 1, 6.

**As per claims 3, 10, 17,** Cochran teaches an apparatus, machine readable mediums for performing a method comprising:

- "synchronizing a data volume of a first node, a data volume of a second node, a data volume of a third node, a data volume of a fourth node, and a data volume of a fifth node" at [0020] and Fig. 1 ;

- “replicating data to be written to said data volume of said first node to said data volume of said second node from said first node” at [0050] and Fig. 10;
- “writing said data to said data volume of said first node, wherein said writing is performed after or in parallel with said replicating said data to said data volume of said second node” at [0050] and Fig. 10;
- “replicating said data to said data volume of said third node, wherein said replicating said data to said data volume of said third node is performed using asynchronous replication from said second node to said data volume of said third node” at [0020]-[0022];
- “replicating said data to said data volume of said fourth node, wherein said replicating said data to said data volume of said fourth node is performed using periodic replication at a first frequency from said third node to said data volume of said fourth node” at [0023];
- “replicating said data to said data volume of said fifth node, wherein said replicating said data to said data volume of said fifth node is performed using periodic replication at a second frequency, from said fourth node to said data volume of said fifth node, wherein said first frequency is different than said second frequency” at [0025]-[0026].

As per claims 5, 12, 19, Cochran teaches the method of claim 3, wherein “said first node is a primary node, said second node is an intermediate node, and said third node is a secondary node” at Figs. 9-11.

**As per claims 6, 13, 20**, Cochran teaches the method of claim 5, further comprising: "replicating said data to a plurality of secondary nodes from said intermediate node" at Fig. 5.

**As per claims 7, 14, 21**, Cochran teaches the method of claim 3, wherein :

- "said replicating said data to said data volume of said second node comprises replicating said data to said data volume of said second node using a first data link coupled between said first node and said second node" at [0020] and Fig. 1;
- "said replicating said data to said data volume of said third node comprises replicating said data to said data volume of said third node using a second data link coupled between said second node and said third node" at [0020] and Fig. 1;
- "said first data link has a different bandwidth than said second data link" at [0002]-[0003].

**As per claim 27**, Cochran teaches the method of claim 1, further comprising:

- "intercepting a request to write said data, wherein said intercepting is performed after said synchronizing, and said request was sent by an application" at [0052]
- "storing said data within a log of said first node, wherein said storing is performed after or parallel with said intercepting" at [0058]
- "notifying said application that said request has been completed, wherein said notifying is performed after or in parallel with said storing" at [0052]

- "said replicating said data to said data volume of said second node is performed after or parallel with said notifying" at [0052]-[0058].

**As per claim 28**, Cochran teaches a method comprising:

- "synchronizing a data volume of a first node, a data volume of a second node, and a data volume of a third node" at [0020] and Fig. 1;
- "intercepting a request to write data to said data volume of said first node, wherein said intercepting is performed after said synchronizing, and said request was sent by an application" at [0052] ;
- "storing said data within a log of said first node" at [0057]-[0058] ;
- "notifying said application that said request has been completed, wherein said notifying is performed after or in parallel with said storing" at [0052]
- "replicating said data to said data volume of said second node from said first node, wherein said replicating is performed after or in parallel with said notifying" at [0009]
- "writing said data to said data volume of said first node" at [0054]-[0056];
- "replicating said data to said data volume of said third node from said second node, wherein said replicating said data to said data volume of said third is performed using periodic replication at a first frequency from said second node to said data volume of said third node" at [0021]-[0022] and Fig. 1.

***Response to Arguments***

5. Applicant's arguments with respect to claims 1, 3, 5-8, 10, 12-15, 17, 19-21, 27-28 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Examiner's Note: Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the Claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

The prior art made of record, listed on form PTO-892, and not relied upon, if any, is considered pertinent to applicant's disclosure.